PAO This is Apollo Control Houston at 40 hours 11 minutes now into the flight of Apollo 8. The Apollo 8 spacecraft is now 144 094 nautical miles in altitude. Our currect velocity is 3991.2 feet per second. Jerry Carr, the capsule communicator here in Mission Control, has just had a rather long chatty conversation with spacecraft commander Frank Borman, in which, among other things, he passed on a bit of news and some ball scores and told Colonel Borman of the release of the 82 crewmen from the Pueblo today. As a matter of fact, they're still talking a bit here and we'll pick up that conversation now.

CAPCOM Right now, on the wires, is that all 82 crewmen of the Pueblo have been returned. They walked across the Bridge of Freedom Monday night.

SC Wonderful!

CAPCOM Said it took about 30 minutes for all 82 men to come across the bridge of no return and that's the one separating North and South Korea. They started across about 11:30 AM and were over by about noon and they brought the body of the crewman that was killed, also.

CAPCOM Okay, Frank, on ball scores, did you get the word on the Baltimore and Minnesota game today?

SC Not the final one.

CAPCOM Okay, final score was the Colts 24, Vikings 14. That gives them the western conference so it looks like for the NFL title, it's gonna be the Browns versus the Colts on the 29th.

SC 29th?

CAPCOM Rog, slow return - you'll get it.

SC Say again.

CAPCOM Roger, come back slow return and we'll get it.

SC I'd rather come back fast and watch it on television.

CAPCOM Atta boy!. Let's see, for the AFL, the big game today was Oakland and Kansas City and Oakland dumped them 41 to 6, so it's looks the AFL title game will be the Raiders and Jets.

SC Righto, that's hard to believe, that score.

CAPCOM Amen! Okay, in yesterday's game, I don't know if you got the score on that. The Cleveland Browns and the Cowboys. The Browns dumped the Cowboys 31 to 20.

SC Now hear that.

CAPCOM The other crying and bellowing. Basketball scores. Houston didn't do so good this weekend. Illinois beat Houston 97 to 84. And North Carolina took the Owls. The score was 85 to 87. We had a couple of words in the paper, Frank on - the Oilers. The Oilers voted George Webster their most valuable player and - although Houston didn't

make anybody on the All Offensive team this year, they put Walt Thugs and Hoyle Granger on the second team.

SC Very good.

CAPCOM But although the Oilers didn't do so well out on the field, they did great in the box office. Bud Adams, Don Klausterman and Wally Lemm were all - real played good. By the way they were at the Cape to watch the show. Houston in eleven games - the Oilers attracted 460,628 people.

SC How much for your record? For them? I don't believe...got that many in Rice Stadium.

CAPCOM I think so. Let's see, the regular season Attendance was about half that. This includes all the exhibition games. The paper says they averaged about 40 480 for the league games.

SC Great.

CAPCOM Well, that's about it for now Frank. We got some more news that they promised they would bring over as soon it comes off the wire. The only thing of real interests were - particularly the Pueblo release. I think you've already been told about the - Nixon-Eisenhower wedding. And about the only other thing is the weather which is pretty clear around here. We've got high overcasts. But it is cold, good visibility, and it's beginning to feel like winter again.

SC Good time for Christmas, good weather for Christmas.

CAPCOM Who have you got up now, Frank?

SC The other two guys are pretty sleepy. They sacked out again. So I am holding the fort down for a while.

CAPCOM Okay, thanks.

SC Roger. Thank you.

CAPCOM Frank we had a little egg nog over Charlie Duke's tonight.

SC Say again.

CAPCOM We had a little egg nog at Charlie Duke's tonight. Val Anders dropped by. She's looking fine. Tell Bill she's doing real fine.

SC Fine. How do you like shift work, Jerry?

CAPCOM It's great Frank. You've got the black watch watching you tonight.

SC Yeah, that's what I figured. Yeah, we're getting along pretty good though now.

CAPCOM Real good. It looks like you're approaching a 150000 miles.

SC Roger.

CAPCOM How does the mode look Frank?

SC Pretty good.

CAPCOM Have you looked at the moon lately?

SC No. I saw it yesterday, but we haven't seen it today.

CAPCOM Frank, you've probably already been told this. But you looked great on TV today. One little homey item though. In the El Lago area you were upstaged by Santa Claus. He came along on a fire engine just about the time you guys came along. So the little critters are all outside.

SC I'll have to get it. I wish we could have got that one lens working. I'd like to share the view here of the earth.

CAPCOM Frank, we've got some guys looking at it. We might be able to find a way to make it work for you. Hopefully, by a couple of hours before TV time tomorrow we'll have an answer.

SC Very good.

CAPCOM John Smith -

END OF TAPE

SC Very good.
CAP COM Ah, Jack Schmitt's working with it too.
SC Very good. That's typhoid Jack.
CAP COM Ha. Ha. Ha.
SC This crew is so good we don't figure we'll have much to debrief.
CAP COM Roger. Probably the biggest part of the debrief will be the medical part.
SC Roger. You're sure right. Oh, we're all in fine shape.
CAP COM Real fine, Frank.
PAO Apollo Control Houston. As you heard Colonel Frank Borman, he is up at the present time by himself minding the store in Apollo 8 while the other two crew members, Jim Lovell and Bill Anders, are taking a rest period. As to condition, he described the crew as all in fine shape acknowledging certainly that the medical debriefing would be a significant one. As you heard, the conversation arranged a wide gamut of subjects but I guess when you're 144,548 nautical miles away from home it is perhaps stimulating to occasionally have what would seem to be at least in a large measure a fireside chat. So, at 40 hours 23 minutes 18 seconds into the flight of Apollo 8, this is Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control Houston. At 41 hours 31 minutes now into the flight of Apollo 8. The Apollo 8 spacecraft at this time is at an altitude of 147 151.4 nautical miles. It is currently traveling at a rate of speed or velocity of 3912.4 feet per second. It's been a period of relative quiet here in Mission Control Center. Our Flight Director now monitoring the command module pilot, Jim Lovell, reports he appears to be sleeping restfully. Meanwhile, we are looking, at the present time, at a clock identified as the digital clock, identified as the LOS clock, which is counting down to that time when we will have a loss of signal as the spacecraft, Apollo 8, travels behind the moon. Just prior to its lunar orbit insertion burn. Clock reading at this time mark is 27 hours 24 minutes 39 seconds away. Just a little more than a day away at this time. Since our last report we have had just only one brief conversation with the spacecraft Commander, Frank Borman. It involved a canister change and we will play that conversation now.

SC Houston. Apollo 8. We have just completed the canister change.

CAP COM Apollo 8. Houston. Roger. Copy.

PAO Apollo Control Houston. That as you could see was marked by its brevity. So at 41 hours 33 minutes 10 seconds into the flight of Apollo 8, this is Apollo Control.

END OF TAPE

PAO This is Apollo Control Houston. 41 hours 52 minutes 35 seconds now into the flight of Apollo 8. Our current altitude on Apollo 8 now 147 956.7 nautical miles. Our current velocity on Apollo 8, 3892 feet per second. We've had a bit of conversation with spacecraft Commander, Frank Borman, and we will pass that along to you now.

CAP COM Apollo 8. This is Houston. We have a handover coming up in 2-1/2 minutes to Guam. Over.

SC Okay Jerry. Thank you. Hey Jerry?

CAP COM Go ahead.

SC Somebody long-range guess what the weather is going to be like Friday.

CAP COM Roger Frank. Apollo 8. Houston, with a weather watch.

SC Go ahead Houston. Apollo 8.

CAP COM Roger Frank. For 7 degrees, 38 minutes north, 155 west landing area, we are showing 2000 scattered, 12 000 broken, high over and 10. The winds from east at 12, 4-foot swells, about an 82 degree temperature. There will be some rain showers in about 10 to 30 percent of the area with ceilings around 2000. If there is - turns out to be a thunderstorm in the area, it will probably have a ceiling around 500 feet. Apollo 8, Houston. Did you copy that weather okay?

SC Roger. I said thank you. Do you read me now?

CAP COM Roger. Reading you much better. We got the voice coming down through Honeysuckle now.

SC Okay.

PAO Apollo Control Houston. As you heard spacecraft Commander, Frank Borman, did request the weather advisory for his time of return to earth and you certainly can't fault the spacecraft Commander for not planning his mission in advance. At the present time, our communications were uplinking from Guam and downlinking voice data through Honeysuckle. At 41 hours 55 minutes 46 seconds into the flight of Apollo 8, this Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control Houston. 42 hours 21 minutes 32 seconds into the flight of Apollo 8. At the present time, Apollo 8 now 14 041.4 nautical miles in altitude. Our - meanwhile our spacecraft velocity continuing to slow down. Our current velocity reading 3864.7 feet per second. Since our last anouncement, we've had only one conversation with the Apollo 8, and we will pass that along to you now.

CAP COM Apollo 8. Houston.

SC Go ahead Houston. Apollo 8.

CAP COM Roger Frank. Can you cycle the H2 and O2 cryo fans now for us?

SC Roger. Will turn her now, the H2, leave on 2 minutes.

CAP COM Roger.

SC You may need to call us now and then. Everybody is a little drowsy.

CAP COM Okay Frank.

SC That completes it Jerry. All cycles are up.

CAP COM Roger Frank.

SC Houston. Apollo 8.

CAP COM Apollo 8. Houston. Roger.

SC Did you get my message about the fans.

CAP COM Sure did Frank. Thanks.

PAO And that concludes the conversation. A procedural one. And at 42 hours 23 minutes 15 seconds into the flight, this is Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control Houston. 43 hours 4 minutes and 22 seconds now into the flight of Apollo 8. The Apollo 8 spacecraft is now past the altitude mark of 150 000 nautical miles. Our current reading here on the display is 150 634.6 nautical miles. Our velocity is shown as 3825.2 feet per second, continuing its slow down process. We've had a conversation with spacecraft Commander, Frank Borman, which began at the onset with Colonel Borman, remarking about the chilly temperature inside the spacecraft. Our current temperature reading being 60 degrees. We will play this conversation which includes a number of aspects relative to the mission - sort of a verbal update of the flight plan. And we will switch to the tape now.

SC Houston. Apollo 8.

CAP COM Apollo 8. Houston. Go. Apollo 8. Houston. Go.

SC Roger. The cabin temperature is down to 60 and it's getting pretty chilly in here. Have you got any approved solutions on how to bring it up? Without stirring up this last thermal balance we have?

CAP COM Roger. Stand by. Frank, do you have your cabin fans on?

SC Negative.

CAP COM Roger.

SC We haven't had them on since we separated.

CAP COM Apollo 8. Houston.

SC Go ahead.

CAP COM Roger. Frank. That course number 3 looks like just a shade more than 1 foot per second, so we don't recommend that you do it. That bleeds us off into a midcourse four of only about 3 feet per second right now. Your trajectory is looking real good. Your height at pericynthion is 70 miles.

SC Roger. Understand.

CAP COM Roger. Roger Frank, hello a few thoughts on what is coming up now. The star sightings when Jim gets up looks right now like we've had enough of the earth/horizon and everything looks real good. And we are ready to start on some lunar/horizon sightings. So when Jim gets up we will pass the flight plan update to him for a set of stars with the moon. Also, around 48 or after the star sightings is when we would like to see your next water dump come up. So, if you can, I recommend you get a little shuteye.

SC Roger. Have you got any answer about warming this place up a little bit?

CAP COM Roger. They are still cranking around.

CAP COM They are talking about cabin fans. But that sounds like sort of a noisy proposition. Apollo 8. Houston.

SC Go ahead.

CAP COM Apollo 8. This is Houston. I have got two messages for you to warm up the cabin there. The first one is a one-man job, about the best way would be to one or both cabin fans on and go full hot on the cabin heat exchanger. It'll be a fairly slow process of warming up and you won't get a whole lot of heating. Your second method would be to adjust with mixing valve your radiator OP temperatures. This is again a two-man job and you have to be pretty careful.

SC Well, Frank just went to bed and Bill isn't up yet. I'll put on the fans and then we will go high on the cabin temperature and see what that does.

CAP COM Okay Jim. Remember, if you use just one fan, cover the other.

SC Roger.

PAO Apollo Control houston. As you no doubt surmized, Frank Borman, did take Jerry Carr's advice and decided to grab some shuteye. Jim Lovell, now awake, took the last part of that transmission. In our verbal update on the flight plan, as you had heard, our next set of star sightings we will use the moon horizon as a reference rather than the earth. This being for program 23. Also our Flight Dynamics Officer, who was closely scrutizing midcourse trade-offs, looking over 1.1 foot per second Delta V versus something on the order of 3 feet per second is strongly inclined toward recommending a midcourse at 61-hour GET mark rather than 47 hours. Initial factor there, the water dump which would occur after the 47-hour mark could very possibly negate part of a very minimal midcourse anyway. The recommendation that it appears very likely that the crew will go with, with regard to the cabin temperature, is one whereby one of the cabin fans would be turned on and the heat exchanger put to full hot. There is some possibility that there would be an increase in noise level, but, this again becomes a trade-off. At 43 hours 10 minutes 45 seconds into the flight of Apollo 8, continuing to monitor, this is Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control, Houston, 43 hours, 33 minutes, 8 seconds now into the flight of Apollo 8. Apollo 8's current altitude - per hours displays 151,686.2 nautical miles. Current velocity, 3700.92 feet per second. Capsule communicator Jerry Carr has just passed along some flight plan update numbers with regard to the program 23 star sightings to command module pilot Jim Lovell. And we'll pick up that conversation.

SC Houston, Apollo 8.

CAPCOM Apollo 8, Houston, GO.

SC Roger. I have used just one fan. You mentioned about covering the other one. Are you sure that's true in this spacecraft?

CAPCOM Roger. That's affirmative.

SC I remember that's the one problem.

CAPCOM Standby, Jim. We'll recheck on that one. Apollo 8, Houston, did you get the word from Frank on the star sighting plans?

SC Roger. I got off the flight plan if you have an update to it now though...now.

CAPCOM Okay. Apollo 8, Houston. Apollo 8, Houston.

SC Go ahead, Houston.

CAPCOM Roger. Are you ready for that flight plan update?

SC Roger. Go ahead.

CAPCOM Okay. At time 4715, delete the P23 sightings you're showing there. And at 45 minutes correction 45 hours, add one additional set of sightings to each star.

SC Okay. You said at 45 hours add one set of sightings to each of the three stars. Is that correct?

CAPCOM That's affirmative. Everybody's real pleased with the earth horizon work and as far as we're concerned you can knock that off and just add one set to each one of your lunar horizon stars at about 45. At 45 our time also is not hard. You can shift it as you desire.

SC Roger. I see things coming up now, Jerry. We're going to get the block data around 44 and we'll do a lima around 4430 and then we'll go into this lunar navigation.

CAPCOM Okay, fine Jim. Then remember after you do the sightings we'll want you to go back to the TTC mode again. And a little curiosity, how's the water tasting and how did you sleep?

SC Water's tasting okay, no problems. And the sleep is getting better. We find it better to sleep underneath the couch now. I was up here with Frank and I

was chosen off periodically over the last several hours. Frank's now below and Bill's below too.

CAPCOM Okay, Jim, thanks.

PAO Apollo Control, Houston. As you heard the star sighting results have been indeed well accepted on the ground. So we'll have here for the first time the lunar horizon becoming the prime reference - point for these navigation exercises. At 43 hours, 37 minutes, 6 seconds into the flight, this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo Control Houston at 43 hours 45 minutes 15 seconds now into the flight of Apollo 8. Our current altitude on Apollo 8 152 125.2 nautical miles. Current velocity reads 3788.4 feet per second. We just had an interesting conversation with Jim Lovell who called. With regard to seeing stars in daylight, Glynn Lunney, incidentally, got on the line, Jerry Carr, the Capsule Communicator was out of the room briefly. And we thought we would pass along that conversation now.

CAP COM Apollo 8. Houston.

SC Go ahead Houston.

CAP COM Apollo 8. We've got a command handover from Guam to Honeysuckle coming up in about 2 and one-half minutes.

SC Roger. Houston. Apollo 8.

CAP COM Go ahead Apollo 8. This is Flight -

SC --at this distance --

CAP COM Say again, Apollo 8.

SC -- this distance there is no problem - there is no problem in seeing stars in the daylight at this distance.

CAP COM Roger. Copy. Apollo 8. Flight.

SC This is eighth class.

CAP COM Jim, are you talking about out the window or out any of the - telescope?

SC I am looking out the window right now. I have the lights out in the spacecraft, the window covered where the sun is. And then I can see the stars very well out the left rendezvous window.

CAP COM Okay, I guess that window is still pretty good for you then.

SC That's right. It is one of the few that is. The center window unfortunately, is all fogged over, it looks like a coating of ice or coating of heavy fog. Bill claims it is something else though.

CAP COM Roger. By the way, I am just getting OJT on this Cap Com job while Jerry is out of the room.

SC Well, we all have to learn sometime.

CAP COM Yes sir.

SC You picked a midnight shift, I see.

CAP COM Yes, it is turning out to be kind of quiet too.

SC We like it that way.

CAP COM Well, things will pick up here by tomorrow night, I think.

SC I believe you are right.

CAP COM We think we show cabin temperature as 70, so maybe you are warming up you.

SC Well, we can feel it warm up. I have both fans on and the - our gages indicate about 70.

CAP COM Okay, and I have got a real Cap Com back now.

PAO Apollo Control Houston. Glynn Lunney's reference of course, to tomorrow night dealt with the lunar orbit insertion times. We are just over a day away, as a matter of fact. Approximately an hour from this time tomorrow would be the time that we would traverse over the back side of the moon. At 43 hours 49 minutes into the flight of Apollo 8, this is Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control Houston at 44 hours 11 minutes into the flight of Apollo 8. At this time, Apollo 8 153 100.2 - 153 100.2 nautical miles in altitude. Our current velocity reading 3764.7 feet per second. Capsule Communicator, Jerry Carr, has just passed along a - passed along block data information to Jim Lovell, aboard the spacecraft. These come out as a long stream of numbers meaningful to the onboard computer. The numbers, by the way, are not part of the ongoing flight plan. These are for a contingency situation only. A means of assuring proper return data for the crew should we have a problem with the communications or lose communications. We'll play that rather extensive tape for you now.

SC Go ahead Houston. This is Apollo 8 here.

CAP COM Apollo 8. This is Houston, with a fly by. A PC, pericynthion plus 2 hours maneuver PAD when you are ready to copy.

SC Roger. Ready to copy.

CAP COM Roger. Your TLI plus 44 maneuver PAD is good - requires no update. Fly by maneuver PAD follows SPS G&N 62954 minus 162 plus 129. Copy?

SC I am copying.

CAP COM Roger. 060 59 4808 plus 00953 plus 00578 minus 02076 000 000 000. Copy?

SC I am copying. Stand by. I am going to switch to omniantenna.

CAP COM Roger. Standing by.

SC Okay. Go ahead.

CAP COM Roger. HA is not applicable plus 00202 02356 022 02280 03 0393 310 013 up 048 right 35 - I repeat right 35. Copy?

SC Copied.

CAP COM Roger. Plus 1418 minus 16505 12904 36160 146 29 11 GDC align with your Sirius Rigel set stars. 137 311 339 no ullage. Copy?

SC We are copying.

CAP COM Roger. I have two comments. Number one. Requires realignment to preferred REFSMMAT. Two. Raises perilune to 554 miles. Over.

SC Roger. I have it. Stand by for read back.

CAP COM Roger. Standing by.

SC Fly by maneuver SPS G&N 62954 minus 162 plus 129 060 59 4808 953 578 those are 00953 and plus 000578 minus 02076 000 000 000 not applicable plus 00202 02356 022 02280 03 0393 310 013 up 048 right 35 plus 1418 minus 165 05 12904 36160 146 2911 Sirius Rigel 137 311 339

SC no ullage requires realignment to preferred REFSMMAT. Raises perilune 554 nautical miles.

CAP COM Roger. Jim. That is correct. Let me know when you are ready for your PC plus 2.

SC Okay, let's go on PC plus 2.

CAP COM Roger. Pericynthion plus 2, south three turns, SPS G&N 61503 minus 158 plus 131 071 36 1244 plus 59578 minus 00086 minus 05287. Copy?

SC I am copying.

CAP COM Roger. 012 080 018 not applicable plus 00203 59813 650 59566 11 2160 332. Copy?

SC Copying.

CAP COM Roger. Earth up 005 right 27 plus 0398 plus 06500 13215 36961 1061911

END OF TAPE

CAPCOM 1 zero 6 1911 Sirius Rigel. 137311339 no ullage copy.

SC Copy.

CAPCOM Roger. I have five remarks. Number one, assume execution of flyby maneuver. Number two, use same alinements as for flyby. Number three, time of midcourse number five for GERU determination GET of 8338. Copy.

SC Roger.

CAPCOM Roger. Two remarks to go. Number four, standby. Number four, use T37 MC dash 4. Steps one through ten and MC8, steps 3 and 4. Remark number five, average Z400K for corridor control charge equals 36531. Over.

SC Roger, Houston. MDC plus 2. Maneuver plan as follows. SPS G & N 615 zero 3 minus 158 plus 131 zero 7136 1244. Copy.

CAPCOM Roger, copy.

SC ...59578 minus zero zero zero 86 minus zero 5287 zero 12 zero 8 zero zero 18. Not applicable. Plus zero zero 2 zero 3 59813 65 zero 5956611216 zero 332 earth up zero zero 5 right 27 plus zero 398 plus zero 65 zero zero 13215369611061911. Sirius Rigel 137311399. No ullage. Assume execution of flyby maneuver. Uses stable lim - limen as the flyby. Time of MTZ5 for gay route determination is 83 plus 38. Use D37 MT4 steps one through ten MD8 steps three and four. Average D400K recorded control chart 36531.

CAPCOM Roger, Jim. That's all correct. Apollo 8 Houston, that PC plus two is a fast return.

SC Roger. we'll send a fast return.

PAO Apollo Control, Houston. And that concludes our voice update on block data. For the past several minutes we've been monitoring the bioenvironmental display here in Mission Control and the cabin temperature is holding steady at a comfortable 70 degrees. It would appear that the - ground solution involving the cabin fan and heat exchanger has worked satisfactorily. So at 44 hours, 26 minutes, 43 minutes into the flight this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo control Houston at 45 hours 1 minute 24 seconds now into the flight. The Apollo 8 spacecraft at this time 154 thousand 847.7 nautical miles in altitude. Its slowing velocity now reading 37 hundred and 22.7 feet per second. We've had no conversational contact with Apollo 8 since our last anouncement. Command module pilot Jim Lovell apparently continuing with his navigation task. At 45 hours 2 minutes into the flight of Apollo 8 this is Apollo control Houston.

END OF TAPE

PAO This is Apollo Control Houston 45 hours 20 minutes 40 seconds now into the flight Apollo 8. Apollo 8's current altitude at this time of 155,579.3 nautical miles above the Earth. The velocity of the spacecraft now reading 3705.1 feet-per-second. We've had contact in the past few minutes with both Jim Lovell and Bill Anders who has just awakened. We'll play that conversation now.

SC Houston, Apollo 8.

CAP COM Apollo 8, Houston. Go.

SC Roger. Just ... interesting things on the - just done a nav with the Moon, the Sun is currently right in the way. I managed to get a one fit on that carry and was working on the second fit and the rim of the Moon just disappeared completely. The view through the sextant is a milky white whether your looking at black sky or the Moon. The tint of the Moon is slightly washed out by the brightness of the Sun. I'll try the next star and see what I can do with it.

CAP COM Roger, Jim.

SC Good morning, Houston. How are the systems looking here lately?

CAP COM Mornin' sleepy head. Systems are looking GO.

SC Thank you.

CAP COM How'd you sleep, Bill?

SC Oh, off and on, Jerry. There was quite a bit of noise in here and anytime somebody responds to a transmission, why, it tends to wake you up. But it was a reasonably good rest.

CAP COM Real fine. We got a little work scheduled for you here. We've got an ECS redundant component check to run and some fuel cell purging to do.

SC Okay, how about if we wait until this NAV exercise is over with.

CAP COM Rog. Bill, what we have planned for you right after Jim gets finished is a waste water dump, a cryo fan cycle, redundant component check, and a fuel cell purge.

SC Roger.

CAP COM We'll be wanting an O2 and H2 fuel cell purge; we'll give you a 20 minute hack on the heater.

SC Okay. Want me to turn 'em on now or when you give me a hack?

CAP COM Ah, you better wait about 20 minutes.

SC Okay.

PAO Apollo Control Houston. So you heard how the Sun with it's close relative proximity tended to wash out the last of NAV siting for Jim Lovell. We expect

APOLLO 8 MISSION COMMENTARY,12/23/68,GET 452050,CST 412a 146/2

PAO we'll hear from him in a short while regarding his next siting. Meanwhile, Bill Anders, now awake and in fairly short order will start his sequence of work with the systems. So, at 45 hours 24 minutes 14 seconds into the flight, continuing to monitor, this is Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control, Houston, 45 hours, 39 minutes, 25 seconds now into the flight of Apollo 8. Apollo 8's current altitude 156,242.7 nautical miles. Our velocity now reading 3689.4 feet per second. Here on the ground we passed along on a correction to the TLI plus 44 hour pad already with the crew. We'll play back that report.

CAPCOM Apollo 8, Houston. Bill, are you still eating?

SC Doing what?

CAPCOM Are you busy eating?

SC Negative. I'm watching the store while Jim does his maps hunting and recording the data point.

CAPCOM Okay. We have a correction to make to your TLI plus 44 pad. It's a - if you've got a chance there we'd like to fire it on up to you.

SC Standby.

CAPCOM Roger.

SC Okay, ready to copy the correction of TLI plus 44.

CAPCOM Roger. The correction is in the remarks at the end. Delete the reference to per - high speed procedure minus NA.

SC Roger. Delete minus NA flash MC1...

CAPCOM All right, that's affirmative and copy the following. This comment should read UT37 MC4 step 1 through 11. Over.

SC Roger. UT 7 MC4 steps 1 through 11.

CAPCOM Roger. Then proceed to longitude control for no calm procedure page NC7.

SC You got a little fast. Say again please.

CAPCOM Roger. That's page MC7. I'll read that again. Then proceed to longitude control for no calm procedure page NZ7. Average 400K V400K for courdier control charts pages 3, 6, 2, 5, 3. I repeat average V400K for courdier control charts is 36253. Over.

SC Roger. Say again. That's average G as in George.

CAPCOM Negative. Average Victor 400K for courdier control charge is 36253.

SC Roger. Average V400K for courdier control chart is 36253.

CAPCOM Roger. The minus NA procedure is okay after abort when the GERU is left then. Zero 7 niner niner zero.

SC Roger. Minus NA procedure is okay for abort when GERU plus zero 7 niner niner zero.

CAPCOM Roger. I'll read back the entire remarks now just to make sure we got it straight. UT37 MC4

steps 1 through 11. Then procedure to longitude control for no calm procedure on page MC7. Average Victor 400K for corridor control chart is 36253 minus NA procedure is okay after abort when GERU is less than zero 7 niner niner zero.

SC Roger, copy.

CAPCOM Apollo 8, Houston.

SC Go ahead.

CAPCOM Bill, you can turn on the H2 fan flying heater now.

SC Okay.

PAO Apollo Control, Houston. Taking down all down that navigator talk was Systems Engineer Bill Anders. Here in Mission Control Center our LOS clock now reading 23 hours, 12 minutes, indicating we are now than a day away from that time the Apollo 8 spacecraft passes - starts it pass over the backside of the moon out of communications range with Mission Control Center. It's relatively quiet here in the Mission Control Center now. However, we don't expect this to be representative of what it will be like in this room this time tomorrow. At 45 hours, 45 minutes, 40 seconds into the flight of Apollo 8, this is Apollo Control, Houston.

END OF TAPE

PAO This is Apollo control Houston at 45 hours 58 minutes 20 seconds now into the flight of Apollo 8. We read Apollo 8's altitude at this time at 156,917.4 nautical miles. The velocity reading shows 36,73.5 feet per second. Jim Lovell has completed his program 23 navigation sightings and at this time the Apollo 8's spacecraft is being returned to a passive thermol control attitude. We'll play the report that command module pilot Lovell passed down to our capsule communicator Jerry Carr now.

CAP COM Apollo 8 Houston

SC Go ahead Houston

CAP COM Jim when you get a chance will either you or Bill give us a crews status report on you and Bill?

SC Roger. We're going to pick up this one set of stars for you then well do that.

CAP COM OK.

SC Have you been getting this data down there in Houston?

CAP COM That's affirmative Apollo 8.

CAP COM Jim so far we've only missed one point that we'll ask you to read back a little bit later.

SC Which one do you need?

CAP COM Stand by. Apollo 8 Houston, what we need is the third mark on the first set star 33 trunion only over.

SC Roger. That's the only one we're in doubt of. We think it was 12020.

SC Roger copy.

SC OK incompletance of 33 at this time Houston. Are you satisfied?

CAP COM Roger Jim.

SC Houston for information on the last 2 start 34 and 40 we're shot at the tip of the librium. If you practically have to imagine the rim continued on past where it goes into the darkness.

CAP COM Roger. I understand they were shot at the tip of the librum.

SC That's affirmative and the area around the entire moon now both the sky and the moon itself are milkey white because of the nearness to the sun.

CAP COM Roger copying. Apollo 8 Houston you can re-establish PTC same, same attitude 224 and 220.

SC Roger your still... now.

CAP COM OK. Apollo 8 Houston

SC Go ahead Houston.

CAP COM We'd like to have you start your waste water dump as soon as you can. Dump to 20 percent. We're doing this in order to get 71 percent of their low eye over.

SC Understand. 20 percent.

CAP COM Roger

PAO Apollo control Houston. We picked up the last transmission as it was going off. The advisory that Apollo 8 should proceed with its waste water dump as soon as possible. So at 46 hours 3 minutes 3 seconds into the flight of Apollo 8 this is Apollo control Houston.

END OF TAPE

PAO This is Apollo Control Houston at 46 hours 25 minutes 22 seconds now into the flight of Apollo 8. We now read an altitude of 157,868.9 nautical miles for Apollo 8. Velocity now reading 3651.2 feet-per-second. The waste water dump has been completed by the Apollo 8 crew and here's a conversation regarding that sequence.

CAP COM Apollo 8, Houston.

SC Go ahead, Houston.

CAP COM Roger. We see waste water coming down now. While it's on it's way down, how about a cryo fan cycle?

SC Okay. Cryo fan cycle I'll make a H2 and O2 fan, one at a time, two minutes each.

CAP COM Roger. (pause) Apollo 8, Houston. We're showing you at 20.0 percent now.

SC Roger. We're showing about 25, we'll shut it off now.

CAP COM Roger. Next on deck is the fuel cell H2 O2 purge.

SC Alright.

PAO So, that's it at 46 hours 27 minutes 10 seconds into the flight. This is Apollo Control Houston.

END OF TAPE

PAO This is Apollo Control Houston at 46 hours, 40 minutes, 20 seconds now in the flight of Apollo 8. Present altitude 158,396.4 nautical miles. Present velocity 3639 feet per second, 3639 feet per second. As we picked up this conversation we find the crew - undergoing one of the systems procedures that of a fuel cell purge. Let's pick up that conversation.

SC Okay, Houston we're ready to start the purge.

CAPCOM Roger, Bill. While you're purging, can you give us a crew status report?

SC That's going to be O2 and H2. Is that correct?

CAPCOM Affirmative.

SC Roger. H2 first okay?

CAPCOM Roger, that's okay.

SC Okay. We're getting H2 flow, Jerry, but we don't have any of the - any vapor particles anywhere. Sand particles started now.

CAPCOM Roger, we confirm your flow and understand your sand particles now.

SC They're not much though. Okay, now going to number two.

CAPCOM Roger.

SC You know it's too bad the side windows are fogged up because we never see any sun in the rendezvous windows and we can't get very good pictures in the foggy windows.

CAPCOM Roger.

SC Okay. Chart number 302.

CAPCOM Roger, Apollo 8. Apollo 8, this is Houston. Would you accept for P27 update state vector to your limb sides and we'd like you to -

SC Say again.

CAPCOM Roger, Bill. Would you set up to accept a state vector update? We'll be putting it in the limb slot and do not unzap. Over.

SC Roger, roger. NORMAL ACCEPT. We're going to have to put the word zap back in the dictionary.

CAPCOM Roger, Batman.

SC Houston, Apollo 8.

CAPCOM Apollo 8, Houston, GO.

SC It might be interesting to note that after NAV firings we ran out B21 and we get a pair of... 666.8 miles.

CAPCOM Roger, copy.

SC I hope you get it long enough...window was closed. Okay start fuel cell 2.

CAPCOM Roger. Apollo 8, Houston. Your state